

WHAT IS CLAIMED IS

1. An apparatus for wrapping groups (1) of products (2) with film, the apparatus (4) comprising at least the following:

a first surface (5), moving in a direction (A) for conveying the products (2) to a second surface (6) for forming the product groups (1) and wrapping the groups (1) with a length of the film (3) using suitable wrapping means (7) having a first drive axis (AE1);

a film (3) feed unit (8) which, by cutting, defines the length of film (3) whose size depends on the dimensions of the group (1) of products to be wrapped; the unit (8) being located below and close to a slot (9) separating the first surface (5) from the second surface (6), and having a second electric drive axis (AE2) to enable a defined quantity of film (3) to be unwound in the direction of the second surface (6);

a unit (10) for pre-unwinding the film (3) and comprising at least one roll (11) of film (3) located upstream of the feed unit (8) in a film (3) unwinding direction (B) and under the first and second surfaces (5, 6), the apparatus further comprising at least the following:

a third, electric drive axis (AE3) located and operative on the pre-unwinding unit (10) to move the film (3) towards the feed unit (8) according to the film (3) requirement or feed speed controlled by the second electric axis (AE2) of the feed unit (8);

a unit (12) which controls the second and third electric axes (AE2, AE3) and which is located and operative between the two electric axes (AE2, AE3) themselves so as to synchronize the control of film (3) feed.

2. The apparatus according to claim 1, wherein the third electric axis (AE3) is located between the roll (11) and a roller (13) that controls the unwinding of the film (3).
3. The apparatus according to claim 1, wherein the third electric axis (AE3) is located and operative on the film roll (11).
4. The apparatus according to claims 1 and 2, wherein the third electric axis (AE3) comprises at least one third variable phase drive (14) positioned between the roll (11) and the roller (13), and one pair of film (3) feed rollers (15, 16), one of which is kinematically connected to the third drive (14).
5. The apparatus according to claim 4, wherein the roller (15) and the third drive (14) are kinematically connected by a toothed belt (17) trained around respective wheels (18, 19) keyed, respectively, to the roller (15) and to a shaft (20) protruding from the third drive (14).
6. The apparatus according to claim 4, comprising, between the roll (11) and the pair of rollers (15, 16), a plurality of idle film (3) tensioning rollers (30) some of which are mounted on a fixed plate (31) that mounts the third drive (14), while the others are mounted on a rocker arm (32) pivoted at (C) on a frame (33) forming part of the apparatus (4).
7. The apparatus according to claims 1 and 3, wherein the third electric axis (AE3) comprises a third variable phase drive (14) axially connected to a rotary drum (21) that supports the roll (11) in such a way as to enable pre-unwinding speed to be directly correlated to the

feed and cutting speed of the feed and cutting unit (8).

8. The apparatus according to claim 1, wherein the pre-unwinding unit (10) also comprises means (22) for controlling the unwound film (3) and which may be positioned between the third electric axis (AE3) and the feed and cutting unit (8) and connected directly to the control unit (12).

9. The apparatus according to claim 8, wherein the control means (22) comprise:

a tubular roller (13) guided on both sides by respective vertical guides (23) and resting freely on the film (3) being unwound so as to be able to slide freely up and down together with the film (3); and at least

one sensor (24) for detecting the presence of the roller (13) and positioned at a point close to a floor (P); the sensor (24) being connected to the control unit (12) and being designed to send to the control unit (12) a signal (S) for stopping a second and the third electric axes (AE2, AE3) when

the roller (13) is at a lowered first position with the film close to the floor (P), that is to say, a position away from the third electric axis (AE3), for a length of time greater than a preset time, corresponding to absence of a call for film (3) by the second electric axis (AE2), and

the roller (13) and the film (3) are at a raised second position, that is to say, close to the third electric axis (AE3), for a length of time greater than a preset time, corresponding to absence of film (3) feed by the third electric axis (AE3).

10. The apparatus according to claim 1, wherein the first axis (AE1) is of the electric type.
11. The apparatus according to claims 1 and 10, wherein the first and second power driven axes (AE1, AE2) comprise, respectively, a first variable phase drive (26) and a second variable phase drive (25).
12. The apparatus according to claims 1 and 11, wherein the control unit (12) is connected to the first (AE1), second (AE2) and third (AE3) electric axes in such manner as to coordinate the respective profiles of motion substantially constituting electric cams.